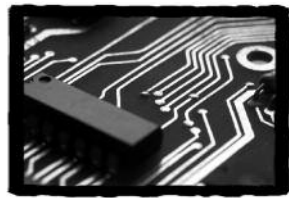


SENIOR YEARS

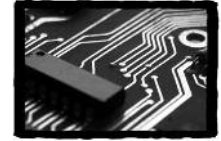
Electricity/Electronics Technology



Fundamental Skills

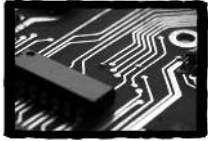
General Learning Outcome

GLO F1 **Technical Communication:** Communicate technical ideas and designs effectively and appropriately



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.F1.1 Use several presentation programs using existing formats to digitally communicate a technical idea.	IA10.F1.1 Design a simple presentation using a presentation program to communicate a technical idea.	IA11.F1.1 Apply an advanced presentation program effectively to communicate a technical idea visually.	IA12.F1.1 Apply an appropriate combination of digital, graphic, oral, and written techniques to effectively communicate a technical idea.
IA9.F1.2 Interpret a graphic presentation of a technical idea.	IA10.F1.2 Adapt a graphic presentation of a technical idea.	IA11.F1.2 Create a graphic presentation of a technical idea.	
IA9.F1.3 Recognize technical language and terms.	IA10.F1.3 Use technical language and terms in the correct context.	IA11.F1.3 Create a set of steps using correct technical writing techniques to effectively describe a technical process.	
IA9.F1.4 Effectively use technical reading skills to follow a set of instructional steps.	IA10.F1.4 Adapt a set of instructional steps using appropriate technical writing skills.		

Fundamental Skills



General Learning Outcome

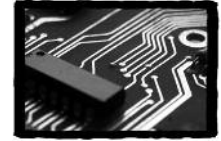
GLO F2 **Problem Solving:** Apply effective decision-making, problem-solving, and design strategies to a project. (Refer to Appendix B for a sample design/problem-solving process.)

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.F2.1 Demonstrate an understanding of the problem-solving process in designing and producing a product.	IA10.F2.1 Identify problems and apply appropriate problem-solving skills to solve them.	IA11.F2.1 Transfer problem-solving skills to real-life situations.	IA12.F2.1 Research and articulate a problem that can be solved through technological means.
IA9.F2.2 Identify criteria for making and evaluating choices.	IA10.F2.2 Apply a decision-making strategy to practical situations.	IA11.F2.2 Use a variety of critical thinking skills to evaluate situations and make decisions.	IA12.F2.2 Apply problem-solving and design skills to develop a technological solution to a problem.
IA9.F2.3 Demonstrate an understanding of the qualities of good design.	IA10.F2.3 Modify an existing design to meet specified criteria.	IA11.F2.3 Create a design to meet a set of specifications.	IA12.F2.3 Analyze critically and act logically to evaluate situations and make decisions.

Fundamental Skills

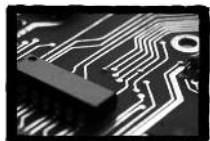
General Learning Outcome

GLO F3 **Information Management:** Effectively manage information.



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.F3.1 Acquire and organize information using appropriate technology and information systems.	IA10.F3.1 Apply specialized information and skills in real-life situations.	IA11.F3.1 Transfer and apply specialized information and skills in a variety of situations.	IA12.F3.1 Acquire, analyze, and apply specialized information and skills from various disciplines in a variety of realistic circumstances.
IA9.F3.2 Demonstrate the appropriate use of information as directed.	IA10.F3.2 Access and use a range of relevant information, material, and human resources with limited direction.	IA11.F3.2 Acquire and use a range of relevant information, material, and human resources, and recognize when additional resources are required.	IA12.F3.2 Support and enhance basic information requirements by using a wide variety of information, material, and human resources.

Personal Skills



General Learning Outcome

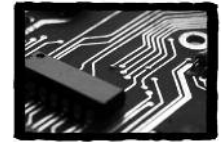
GLO P1 **Time Management:** Demonstrate responsibility in time management, task completion, and in meeting project criteria. (Note: based on the Conference Board of Canada's Personal Management Skills)

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.P1.1 Demonstrate responsibility in time management.	IA10.P1.1 Demonstrate responsibility in time management.	IA11.P1.1 Demonstrate responsibility in time management.	IA12.P1.1 Demonstrate responsibility in time management.
IA9.P1.2 Demonstrate responsibility in being accountable for one's actions.	IA10.P1.2 Demonstrate responsibility in being accountable for one's actions.	IA11.P1.2 Demonstrate responsibility in being accountable for one's actions.	IA12.P1.2 Demonstrate responsibility in being accountable for one's actions.
IA9.P1.3 Arrive at class prepared with materials and completed assignments.	IA10.P1.3 Arrive at class prepared with materials and completed assignments.	IA11.P1.3 Arrive at class prepared with materials and completed assignments.	IA12.P1.3 Arrive at class prepared with materials and completed assignments.
IA9.P1.4 Complete all assigned tasks within stated deadlines.	IA10.P1.4 Complete all assigned tasks within stated deadlines.	IA11.P1.4 Complete all assigned tasks within stated deadlines.	IA12.P1.4 Complete all assigned tasks within stated deadlines.
IA9.P1.5 Complete all projects according to specified criteria.	IA10.P1.5 Complete all projects according to specified criteria.	IA11.P1.5 Complete all projects according to specified criteria.	IA12.P1.5 Complete all projects according to specified criteria.

Personal Skills

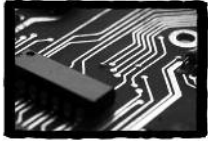
General Learning Outcome

GLO P2 **Ethical Decision Making:** Make ethical decisions concerning the impact of one’s activities and the use of technology.



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
<p>IA9.P2.1 Make personal judgments whether certain behaviours/actions are right or wrong.</p> <p>IA9.P2.2 Demonstrate an understanding of technological impact on the environment, society, lifestyles, etc.</p>	<p>IA10.P2.1 Assess how personal judgments affect peer members and/or community members.</p> <p>IA10.P2.2 Demonstrate an understanding of the impact of technological choices.</p>	<p>IA11.P2.1 Assess the implications of personal/group actions within the broader community.</p> <p>IA11.P2.2 Develop and implement risk management strategies for a variety of technological activities.</p>	<p>IA12.P2.1 Analyze the implications of personal/group actions within the global context.</p> <p>IA12.P2.2 State and support a personal code of ethics as required.</p> <p>IA12.P2.3 Demonstrate responsible leadership in managing current and future technologies on the environment and on society.</p>

Personal Skills



General Learning Outcome

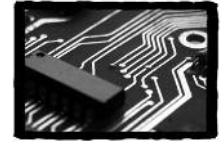
GLO P3 **Career Planning:** Develop an action plan relating personal aptitudes and abilities to occupational opportunities.

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.P3.1 Identify critical skills needed for employability in today's workplace.	IA10.P3.1 Evaluate employability profiles for a variety of workplaces and careers.	IA11.P3.1 Develop strategies to assess personal technological literacy and capability.	IA12.P3.1 Assess specific personal skills, interests, and abilities (career portfolio).
IA9.P3.2 Demonstrate an awareness of the technologies of specific occupations and workplaces.	IA10.P3.2 Outline skills required for a specific career path.	IA11.P3.2 Perform an assessment of personal strengths and weaknesses (career portfolio).	IA12.P3.2 Develop a plan for acquiring the technological capabilities required to achieve a career vision (career portfolio).

Personal Skills

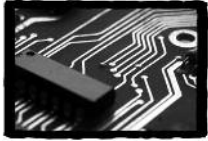
General Learning Outcome

GLO P4 **Safe Practices:** Demonstrate safe practices with tools, machines, materials, and related processes. (Refer to: Keeping Your Facilities SAFE: A Support Document for Industrial Arts Teachers, Manitoba Education and Youth, 2003.)



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.P4.1 Follow personal and environmental health and safety procedures.	IA10.P4.1 Recognize and follow personal and environmental health and safety procedures.	IA11.P4.1 Establish and follow personal and environmental health and safety procedures.	IA12.P4.1 Transfer and apply personal and environmental health and safety procedures to a variety of environments and situations.
IA9.P4.2 Identify immediate hazards and their impact on self, others, and the environment.	IA10.P4.2 Identify immediate and potential hazards and their impact on self, others, and the environment.	IA11.P4.2 Identify immediate and potential hazards and assess their impact on self, others, and the environment.	IA12.P4.2 Identify immediate and potential hazards and assess their impact on self, others, and the environment, and recommend safe procedures.
IA9.P4.3 Identify and follow appropriate emergency response procedures.	IA10.P4.3 Identify and follow appropriate emergency response procedures.	IA11.P4.3 Identify and follow appropriate emergency response procedures.	IA12.P4.3 Identify and follow appropriate emergency response procedures.

Personal Skills



General Learning Outcome

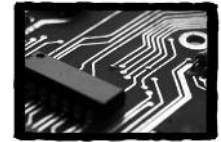
GLO P5 **Positive Attitude:** Demonstrate positive attitudes to learning in Industrial Arts facilities.

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.P5.1 Listen, in order to understand and learn.	IA10.P5.1 Listen and respond, in order to understand and learn.	IA11.P5.1 Listen and respond, in order to understand, learn and teach.	IA12.P5.1 Listen and respond, in order to understand, learn, teach, and evaluate.
IA9.P5.2 Demonstrate a willingness to continuously learn.	IA10.P5.2 Assess personal learning needs (i.e., personal learning style).	IA11.P5.2 Identify learning sources and opportunities.	IA12.P5.2 Set learning goals and develop a personal learning plan.
IA9.P5.3 Actively participate in a positive manner.	IA10.P5.3 Actively participate in a positive manner.	IA11.P5.3 Actively participate in a positive manner.	IA12.P5.3 Actively participate in a positive manner.

Personal Skills

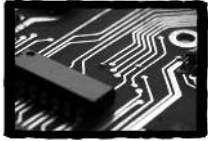
General Learning Outcome

GLO P6 **Teamwork:** Adapt strategies to work effectively, independently, or as a team member to complete a project.



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.P6.1 Demonstrate an understanding of the role of members of a team.	IA10.P6.1 Contribute to a team to achieve its mandate.	IA11.P6.1 Identify the need to lead and/or support in a team situation, in order to achieve the team mandate.	IA12.P6.1 Understand and work with others on a "job" to achieve the best results.
IA9.P6.2 Acknowledge the opinions and contributions of all team members.	IA10.P6.2 Respect the opinions and contributions of all team members.	IA11.P6.2 Seek and appreciate the opinions and contributions of all team members.	IA12.P6.2 Lead and/or support as appropriate to motivate a team for high performance.
IA9.P6.3 List and define team objectives.	IA10.P6.3 Contribute to the development of team objectives and goals.	IA11.P6.3 →	IA12.P6.3 Develop and/or refine a team approach based on needs and benefits.

Production Skills



General Learning Outcome

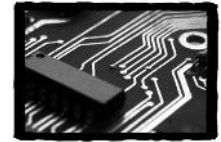
GLO EE1 **Tools and Equipment:** Identify and demonstrate proper use of tools, materials, and equipment utilized in electricity/electronics.

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.EE1.1 Identify and utilize common hand tools used in electricity/electronics.	IA10.EE1.1 →	IA11.EE1.1 →	IA12.EE1.1 →
IA9.EE1.2 Identify and utilize several common pieces of test equipment used in electricity/electronics such as ohmmeters, ammeters, voltmeters, power supplies...	IA10.EE1.2 →	IA11.EE1.2 →	IA12.EE1.2 Identify and utilize most common pieces of test equipment used in electricity/electronics including several specialized pieces of test equipment such as programmable power supplies, function/pulse/signal generators, component measuring devices, frequency counters, spectrum analyzers, logic analyzers....
IA9.EE1.3 Select appropriate test equipment to measure specified functions of an electricity/electronics circuit.	IA10.EE1.3 →	IA11.EE1.3 →	IA12.EE1.3 Apply appropriate test equipment techniques to the analysis, repair, and calibration of electricity/electronics circuits and devices.

Production Skills

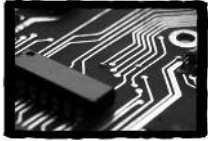
General Learning Outcome

GLO EE2 **Circuit Construction:** Apply appropriate fabrication techniques to construct electricity/electronics devices.



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.EE2.1 Use correct procedures to solder basic electricity/electronics circuitry.	IA10.EE2.1 →	IA11.EE2.1 →	IA12.EE2.1 Use correct procedures to solder electricity/electronics circuitry including unique and heat sensitive circuits.
IA9.EE2.2 Breadboard simple circuits from given schematic diagrams.	IA10.EE2.2 →	IA11.EE2.2 →	IA12.EE2.2 Breadboard complex circuits from given schematic diagrams.
IA9.EE2.3 Construct simple printed circuits.	IA10.EE2.3 →	IA11.EE2.3 →	IA12.EE2.3 Design, plan, and construct complex printed circuits.
IA9.EE2.4 Troubleshoot and repair simple electricity/electronics circuitry.	IA10.EE2.4 →	IA11.EE2.4 →	IA12.EE2.4 Troubleshoot and repair complex electricity/electronics circuitry.

Production Skills



General Learning Outcome

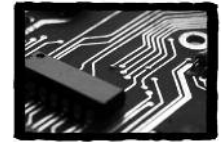
GLO EE3 **Components:** Demonstrate the function of electricity/electronics passive and active components.

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.EE3.1 Identify common electricity/electronics passive and active components such as resistors, conductors, semiconductors, control devices...	IA10.EE3.1 →	IA11.EE3.1 →	IA12.EE3.1 Describe the function, properties, and schematic symbols of most common electricity/electronics passive and active components.
IA9.EE3.2 Select appropriate components for a circuit given a schematic diagram.	IA10.EE3.2 →	IA11.EE3.2 →	IA12.EE3.2 →

Production Skills

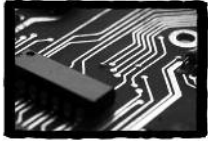
General Learning Outcome

GLO EE4 **Laws and Theory:** Apply electricity/electronics laws and theory.



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.EE4.1 Demonstrate an understanding of basic electrical laws and formulas such as Ohm's Law, Watt's Law, the law of magnetism...	IA10.EE4.1 →	IA11.EE4.1 →	IA12.EE4.1 Apply mathematical calculations and formulas to analyze electricity/electronics circuitry.
IA9.EE4.2 Demonstrate an understanding of basic DC electrical theory including concepts such as the atomic model, electrons, current, electromotive force, potential difference, volt, resistance, inductance...	IA10.EE4.2 →	IA11.EE4.2 →	IA12.EE4.2 Apply DC theory to analyze electricity/electronics circuitry.
IA9.EE4.3 Demonstrate an understanding of basic AC electrical theory including concepts such as sine wave, AC generation, hertz, induction, capacitive reactance...	IA10.EE4.3 →	IA11.EE4.3 →	IA12.EE4.3 Apply AC theory to analyze electricity/electronics circuitry.

Production Skills



General Learning Outcome

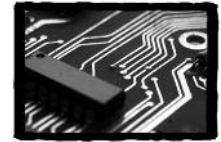
GLO EE5 **Circuits and Systems:** Identify and analyze basic electricity/electronics circuits.

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.EE5.1 Identify basic electricity/electronics circuits such as series, parallel, combination, rectifier, oscillator, amplifier, pulse, logic...	IA10.EE5.1 →	IA11.EE5.1 →	IA12.EE5.1 Design and troubleshoot basic electricity/electronics circuits.
IA9.EE5.2 Identify basic circuits within electricity/electronics systems such as power control devices, signal producing-receiving devices, analog, and digital systems...	IA10.EE5.2 →	IA11.EE5.2 →	IA12.EE5.2 Combine basic electricity/electronics circuitry to produce systems that achieve specified functions.
IA9.EE5.3 Produce schematic and/or block diagrams of electricity/electronics circuits and systems.	IA10.EE5.3 →	IA11.EE5.3 →	IA12.EE5.3 →

Production Skills

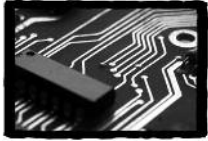
General Learning Outcome

GLO EE6 **Applications:** Develop an understanding of electricity/electronics applications.



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.EE6.1 Identify basic circuitry and systems used in simple real-world electricity/electronics applications such as alarm systems, residential wiring, radio, television, digital logic circuits...	IA10.EE6.1 →	IA11.EE6.1 →	IA12.EE6.1 Combine electricity/electronics circuits and systems to create electricity/electronics devices and applications that perform specific functions.
IA9.EE6.2 Troubleshoot and repair basic electricity/electronics systems and applications.	IA10.EE6.2 →	IA11.EE6.2 →	IA12.EE6.2 →

Production Skills



General Learning Outcome

GLO EE7 **Current Innovation:** Demonstrate an understanding of current innovation in electricity/electronics processes, applications, and emerging new technologies.

Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.EE7.1 Identify several current innovations in electricity/electronics such as Computer Numerical Control, robotics and automation, digital communication, fibre optic networks, Nano-technology, circuit simulation software ...	IA10.EE7.1 →	IA11.EE7.1 →	IA12.EE7.1 Research, explain, and demonstrate several current innovations in electricity/electronics.